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# General Notes.

## MINERALOGY AND PETROGRAPHY.[1]

**Petrographical News.**—The granite bosses of Morbihan, France, have suffered on their peripheries certain modifications which are ascribed by Barrois[2] to the rate of cooling. These modifications are endomorphous contact effects, but are in no way dependent upon the nature of the surrounding rocks. Two cases are recognized, according as the boundary lines of the bosses correspond with the strike of the enclosing strata or are perpendicular to it. In the first case, the granite, which is a muscovite-biotite rock, possesses on its periphery a zone of granite porphyry, with its phenocrysts arranged in fluidal lines. In the second case, the exterior modification is a fine-grained panidiomorphic aplite. Since the aplite and the porphyry both contain their constituents in idiomorphic grains, the author concludes that the crystallization of the magma yielding these and the granite has gone on progressively, the porphyritic rocks representing an intermediate stage in the formation of a granite from a magma. Schistose granites (gneisses) on the peripheries of these same bosses are aplites and porphyries that have been crushed by mechanical forces and then recemented by the deposition of secondary quartz. Since the gneisses are found only on the south sides of the bosses, the pressure to whose existence they are due is supposed to have come from that direction. ——Mr. Iddings[3] has continued[4] his study of the cause of different structures in rocks produced from the same magma, and has published some of the results of his investigations on the igneous rocks of the Yellowstone Park. This study is concerned principally with the chemical relation of different rocks produced by the cooling of a single molten magma under different conditions. Electric Peak is a neck of diorite cut by numerous dykes of porphyrite. Separated from this by a great fault is Sepulchre Mountain, made up in large part of surface flows of the magma that was extruded through the orifice at Electric Peak. This magma under the conditions surrounding flows formed pyroxene and hornblende andesites. The chemical composition of the group of plutonic rocks (represented at Electric Peak) and of the effusive group (at Sepulchre Mountain) is shown to be the same. The structure of their members and their mineral composition, however, are different, and these are shown by the author to be due to the different conditions under which the two groups solidified. The different mineralogical compositions of the various rocks belonging to the same group are likewise shown to be functions of the slight differences which occur in their geological environment. This affects the rate at which the heat escapes from the magma, and also the pressure which is experienced during its crystallization. These in turn affect the efficacy of the mineralizing agents held absorbed by the magma before its solidification. The mineralizing agents in turn show their effect upon the magma in the nature of the minerals separated from it.——Renard[5] announces that the rocks of St. Thomas, in the Antilles, are diorites, containing phenocrysts of hornblende, and diabases. The former contain oligoclase, and the latter bytodnite or anorthite. They are both much altered. The feldspar of the diorites has in most cases changed into epidote and quartz; that of the diabases into epidote, chlorite and calcite.——The same author[6] describes the rocks of the island of Teneriffe as scoriaceous basalts, containing olivine and augite of the first consolidation. The very light color of the latter mineral and its well-marked polysynthetic twinning lamellæ cause it to resemble plagioclase. The lack of plagioclase places the rock in the group of the limburgites. The rocks from the crater of the Cañadas are also basalts, whose olivines are filled with muscovitic inclusions. Large crystals of andesine present in it have an undulous extinction. Augite andesites and trachytes containing sodalite, augite and sanidine with an undulous extinction are also described.——An interesting suite of analyses of some lower Silurian felsites from the southeast of Ireland enables Hatch[7] to divide these rocks into potash, soda, and potash-soda felsites. The first group comprises felsites with few or no phenocrysts, while the second and third groups contain many porphyritic crystals of a striated feldspar in a cryptocrystalline aggregate of orthoclase and quartz. The phenocrysts may be albite or anorthoclase, while the feldspar of the ground-mass is orthoclase. The composition of the three groups may be represented by the following analyses:

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2] Soc. Geol. du Nord., XV., 1887–8. p. 1.

[3] Bull. Philos. Soc. of Wash., XI., p. 191.

[4] AMERICAN NATURALIST, Dec., 1885, p. 1216, and Aug., 1889, p. 718.

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[5] Proc. Verb. Soc. Belg. d. Geol., II., 1888, p. 212.

[6] Bull. Soc. Belg. d. Geol. Memoires, XII., 1888, p. 67.

[7] *Geol. Magazine*, Dec., 1889, p. 545.

| | $SiO_2$ | $Al_2O_3$ | $Fe_2O_3$ | FeO | CaO | MgO | $K_2O$ | $Na_2O$ | Loss | Sp. Gr. |
|---|---|---|---|---|---|---|---|---|---|---|
| (1) | 70.8 | 15.1 | 1.0 | .6 | .2 | 1.1 | 9.1 | | 1.6 | 2.606 |
| (2) | 71.2 | 16.8 | .8 | 1.5 | .8 | .9 | 2.1 | 4.7 | 1.5 | 2.606 |
| (3) | 70.6 | 15.3 | .7 | 1.7 | .8 | .8 | 6.1 | 2.7 | .9 | 2.645 |

——Wethered[8] has examined the Jurassic pisolite of Cheltenham, England, and has discovered to his surprise that its structure is not concretionary, but that it is of organic origin. The spherules show a nucleus, surrounded by numerous concentric layers of innumerable minute tubuli, produced by an organism similar to *Girvanella.*——The Kentish Rag, from near Maidstone, Eng., contains a large proportion of calcium sulphide, as shown by an analysis made by Mr. Sanford:[9]

| $SiO_2$ | $Fe_2O_3.Al_2O$ | $P_2O_5$ | CaO | MgO | Alk. | $CO_2$ | $SO_3$ | CaS | Aq |
|---|---|---|---|---|---|---|---|---|---|
| 72.051 | 2.15 | .055 | 12.523 | .054 | .122 | 9.984 | .647 | 1.334 | .995 |

——Some of the peculiarities of the numerous dykes cutting the slates and granite in the neighborhood of Kennebunkport, Maine, are mentioned by Mr. Kemp.[10] The rocks forming the dykes are granites, diabases, camptonites, and diabase porphyrites.

**New Minerals.**—*Redingtonite, knoxvillite, metastibuite* and *nopalite.*—At the hundred and fifty foot level of the Redington Mine, in the Knoxville District, California, is a hydrous chromium sulphate, supposed to be the result of the action of solfataric gases upon chromic iron. The mineral occurs as a finely fibrous mass of a pale purple color, that becomes colorless in the thin section. The fibres are doubly refractive, and have an extinction varying between 13° and 38°. When heated, the mineral turns green without losing all of its water, and then agrees in most of its properties with *copiapite.* The green sulphate consists of rhombic tables with angles of 78° and 120°. They have good cleavages parallel to the base, the prismatic faces and the macropinacoid. The absorption is greatest when the short diagonal of the crystals corresponds with the principal plane of the nicol. The axes of elasticity lie in the oP face—the one parallel to the brachy-axis being the greater. Mr. Becker[11] calls the purple mineral *redingtonite* and the green one

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[8] *Geol. Magazine*, May, 1889, p. 197.

[9] Ib. Feb., 1889, p. 73.

[10] *Amer. Geologist*, Mar., 1890, p. 129.

[11] G. F. Becker: Geology of the Quicksilver Deposits of the Pacific Slope. Monographs XIII. Washington, 1888, p. 343.

*knoxvillite.* A brick-red sulphide of antimony from the filling of a vein in a sinter deposit in the Steamboat Springs District, near the Comstock Lode, Nevada, is named *metastibnite* by the same author. *Napalite*[12] is a dark reddish-brown substance of the consistency of shoemaker's wax occurring at the Phœnix Quicksilver Mine, Pope Valley, California. Its hardness is 2, and specific gravity 1.02. It is brittle. It fuses at 42°–46°, and boils at 300°. When first taken from the ground it is green by reflected light, and garnet by transmitted light. Upon exposure it loses its green fluorescence. The composition of the mineral is supposed to be near $C_3H_4$. ——*Nesquehonite*[13] is an alteration product of *lansfordite*, the new magnesium compound described by Genth[14] a few months ago. The latter mineral, upon exposure, rapidly changes over into prismatic, orthorhombic crystals, usually arranged in radiating groups. Their axial ratio is $a:b:c = .645 : 1 : .4568$. oP is the plane of the optical axes. The brachy-axis is the acute bisectrix, which is negative. The optical angle $2V_{na} = 53° 5'$. Hardness = 2.5, and Sp. Gr. = 1.83. The composition of the substance corresponds to $MgCO_3 + 3H_2O$ [$CO_2 = 30.22$; $MgO = 29.22$, $H_2O = 40.32$]. Artificial nesquehonite has been prepared by allowing aqueous solutions of magnesium carbonate containing carbon dioxide to stand undisturbed for some time. The crystals thus obtained present the same features as the natural product. Measurements of the indices of refraction on one of these crystals gave: $\alpha = 1.495$, $\beta = 1.501$, $\gamma = 1.526$. Perfect pseudomorphs of nesquehonite after lansfordite (incrustations and stalactites) were found at the locality from which the latter mineral has been described—Lansford, Schuylkill Co., Pa.——*Natrophilite* is a new member of the triphylite group lately described by Messrs. Brush and Dana[15] from Branchville, Connecticut. The mineral is usually found in masses with a good cleavage, although occasionally grains with an indistinct crystal form are detected. It resembles very closely the lithiophilite ($LiMnPO_4$) discovered by the same authors some time ago, in both its morphological and optical aspects. Its color, however, is a deep wine, resembling the tint of Brazilian topaz. Its most characteristic features are its very brilliant lustre and its easy alteration into a a pale yellow, silky, fibrous substance that covers all its surfaces and penetrates its mass. The composition of natrophilite, as determined by Mr. H. L. Wells, is:

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[12] Becker: Ib., p. 372.

[13] Genth and Penfield: *Amer. Jour. Sci.*, Feb., 1890, p. 121.

[14] AMERICAN NATURALIST, April, 1889, p. 261.

[15] *Amer. Jour. Sci.*, March, 1890, p. 205.

| $P_2O_5$ | MnO | FeO | $Na_2O$ | $Li_2O$ | $H_2O$ | Loss |
|---|---|---|---|---|---|---|
| 41.03 | 38.19 | 3.06 | 16.79 | .19 | .43 | .81, |

essentially $NaMnPO_4$. The new mineral is regarded as but another one of the very interesting substances produced by the alteration of *spodumene* and *lithiophilite.* The *triphylite* group as now known consists of triphylite ($LiFePO_4$), lithiophilite ($LiMmPO_4$), and natrophilite ($NaMnPO_4$), besides many intermediate compounds.——*Rosenbuschite, nordenskjoldite,* and *melanocerite* have been described by Brögger[16] from the syenite dykes in the vicinity of the Langesundsfiord, in Southern Norway. The first mineral is found in radial groups composed of monoclinic fibres with cleavages parallel to oP, $\infty P\overline{\infty}$ and $2P\overline{\infty}$. The axial ratio is $a : b : c = 1.1687 : 1 : .9775$. $\beta = 101°$ $47'$. The acute bisectrix is *b*. The obtuse bisectrix is inclined 36° to *c* in the acute angle *β*. Double refraction strong. The mineral is easily fusible, and is decomposed with strong hydrochloric acid. It is light orange gray in color, and is weakly pleochroic with $C > B > A$. Its specific gravity is 3.31 and hardness 5–6. In morphological properties and in composition it is apparently a zirconium *pectolite.*

| $SiO_2$ | $ZrO_2$ | $TiO_2$ | $Ti_2O_3$ | $Fe_2O_3$ | $La_2O_3$. | $(DiCE)_2O_3$ | MnO | CaO | $Na_2O$ | Loss |
|---|---|---|---|---|---|---|---|---|---|---|
| 31.53 | 18.69 | 6.07 | 1.31 | 1.15 | | 2.38 | 1.85 | 25.38 | 10.15 | .20 |

——*Nordenskjoldite* is a calcium-tin-borate with the composition [Ca Sn $(BO_3)_2$]:

| $SnO_2$ | $ZrO_2$ | CaO | $B_2O_3$ | Loss |
|---|---|---|---|---|
| 53.75 | .90 | 20.45 | 23.18 | 1.72 |

It crystallizes rhombohedrally with $a : c = 1 : .8221$, and is tabular in habit. It is sulphur yellow in color, is transparent, optically negative and strongly doubly refractive. Its hardness is 5½–6 and Sp. Gr. 4.2. *Melanocerite* is also rhombohedral with $a : c = 1 : 1.2554$. It occurs in tabular crystals of a deep brown or black color. Their double refraction is negative, hardness 5–6, and specific gravity 4.129. Chemically the mineral is a complicated compound of the rare earths with silica, tantalum, boron, and fluorine.——*Cohenite* is described by Weinschenck[17] from the meteoric iron of Magura, Hungary. When dissolved in hydrochloric acid the meteor leaves a residue in which little prismatic tin white crystals are discovered. These turn brown when exposed to the air. They are highly magnetic, are brittle, have a hardness of 5.5–6, and a specific gravity of 6.977. When analyzed they yield Fe = 90.19; Ni = 3.08; Co = .61; C = 6.70; P = .08; and traces of Cu and Sn—a composition corresponding to the carbide of iron and nickel $(55Fe.\ 2NiCo)_3C$.——In addition to the organic compound napalite, referred to above, two others have lately been described; one by Blake[18] from the Uintah Mountains in Wahsatch County, Utah, to which he has given the name *wurtzilite*, and the other by Morrison[16] from the old red sandstone at Craig Well, near Dingwall. The latter is a mineral tar, associated with *albertite*. It is called *elaterite*. Its composition as found by Macadam is C = 81.186; H = 13.372; O., etc., = .4453; N = .127; S. = .862. *Wurtzilite* is a firm, black, solid substance resembling jet. It is found in large, pure, amorphous masses a little heavier than water, and elastic in thin flakes. In thin pieces it is garnet red. Its hardness is 2–3, and specific gravity 1.03. It does not fuse in boiling water, but melts readily in the flame of a candle, when it burns with little smoke. It does not dissolve easily in any of the usual reagents.——Two new minerals to which names have not yet been given by their discoverers have been described respectively by Sjögren[20] and Ussing[21]. Sjögren's mineral occurs in vitreous, transparent, light green tables, associated with *synadelphite*, at the mine Ostra, in Nordmark, Sweden. The tables possess an easy cleavage and a pearly lustre. They are biaxial, with the plane of their optical axes nearly normal to the cleavage plane. The axial angle is small. Before the blowpipe the mineral blackens and fuses with difficulty. In the air it oxidizes and becomes dirty gray or brown. A qualitative examination shows the presence of As, Mn, Zn, and Fe. Ussing's compound is found imbedded in microcline, and associated with aegerine and lithium mica. It forms, small, thick rhombohedral crystals, with $a : c = 1 : 2.1422$. The principal forms present are 0R, $\frac{1}{6}$R, $\frac{1}{4}$R, R, $\infty$ R,—2R,—$\frac{1}{2}$ R and $\infty$ P2. The faces are sometimes brilliant, and at others dull. The crystals are yellowish-brown and translucent. They are optically uniaxial and positive. Their specific gravity is 2.07, and hardness 5. In form, they resemble *eudyalite*. Their locality is Kangerdluarsuk, Greenland.

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[16] Geol. För. i. Stockholm Förh., IX., 1887, p. 247. Ref. *Neues Jahrb. f. Min., etc.,* 1889, II., p. 432.

[17] Ann. K. K. Naturh. Hofmus., Wien., IV., 1889, p. 94.

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[18] *Eng. and Min. Jour.*, December 21, 1889.

[19] *Min. Mag.*, March, 1889, p. 133.

[20] Ofversigt af Kongl. Vetenskaps-Ak. Förh., Stockholm, 1888, p. 561. Ref. *Neues Jahrb. f. Min., etc.*, 1890, I., p. 24.

[21] Geol. Fören. Förh., X., p. 190, Stockholm. Ref. *Neues. Jahrb. f. Min., etc.*, 1890, I. p. 25.

**Miscellaneous.**—Perlitic structure, according to Mr. Chapman,[22] may be produced in Canada balsam by heating this substance until it is thick enough to become brittle when cold, and then pouring it upon a roughened glass plate and suddenly immersing in cold water.——Harker[23] ascribes the eyes of pyrite in slate to the displacement of the matrix around pyrite crystals through pressure. Because of its hardness the pyrite resists the pressure. The slate yielding to it breaks away from the crystal along a plane perpendicular to the line of force, and leaves little hollows on both sides of it. The hollows are afterwards filled with quartz. The eyes consist of pyrite, forming a center, imbedded in a lenticular mass of quartz or some other secretionary mineral.——In a book of about two hundred and seventy pages Mr. Merrill[24] publishes a catalogue of the building stones in the collection of the National Museum, and gives a very clear and succinct account of the methods employed in quarrying and finishing the various rocks used in construction.——A very valuable account of the mineral resources of Michigan is given by Mr. Lawton[25] in his annual report as Commissioner of Mineral Statistics of Michigan.——Dick[26] describes a new form of binocular microscope for use in petrographical investigations, made according to his own design. The most important new feature of the instrument is the connection of the two nicols, which may be made to revolve together or separately, at the will of the manipulator.

## BOTANY.

**Three Suggestions on Botanical Terminology.**—So far as I can find there are at least two very marked and interesting phenomena in the physiology of plants which have as yet received no appropriate names by which they may be always recognized and under which they may be discussed. These are—first, the peculiar irritability of twining plants, in view of which, together with their negative geotropism and their asymmetrical nutations, the spiral habit of growth is maintained. From the most recent researches it appears probable that Von Mohl was correct in his early conjecture that some such specific irritability existed in twining plants, and it is proper that this specific irritability

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[22] *Geol. Mag.*, Feb., 1890, p. 79.

[23] Ib., Sep., 1889, p. 397.

[24] Rep. Smiths. Institution, 1885–6, Pt. II.

[25] Mines and Mineral Statistics. Lansing, 1889.

[26] *Min. Mag.*, March, 1889, p. 160.